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### Achieving transparency

**Citation for published version:**

Ward, D 2016, 'Achieving transparency: An argument for enactivism', *Philosophy and Phenomenological Research*, vol. 93, no. 3, pp. 650-680. <https://doi.org/10.1111/phpr.12188>

**Digital Object Identifier (DOI):**

[10.1111/phpr.12188](https://doi.org/10.1111/phpr.12188)

**Link:**

[Link to publication record in Edinburgh Research Explorer](#)

**Document Version:**

Peer reviewed version

**Published In:**

Philosophy and Phenomenological Research

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## **Achieving Transparency: An Argument For Enactivism**

**Abstract:** The transparency of perceptual experience has been invoked in support of many views about perception. I argue that it supports a form of enactivism – the view that capacities for perceptual experience and for intentional agency are essentially interdependent. I clarify the perceptual phenomenon at issue, and argue that enactivists should expect to find a parallel instance of transparency in our agential experience, and that the two forms of transparency are constitutively interdependent (Section 1). I then argue that i) we do indeed find such parallels: the way in which an action is directed towards its goal through our bodily movements parallels the way in which an experience is directed towards its object through our perceptual sensation (Section 2), and ii) reflecting on sensorimotor skills shows why the two instances of transparency are constitutively interdependent (Section 3). Section 4 gives reasons for generalizing beyond the cases considered so far by applying the enactive view to Kohler’s landmark studies of perceptual adaptation. The final section clarifies the form of enactivism to which the previous sections point. The view that emerges is one whereby our perceptual and practical skills are interrelated aspects of a single capacity to have one’s mind intentionally directed upon the world. The transparency of experience, on this view, is achieved in virtue

of our capacities as agents as much as it is given in virtue of our capacities as perceivers.

## 1. Transparency and Enactivism

G. E. Moore famously noted that our conscious visual experience of the world is diaphanous, or transparent, in the following sense:

“The moment we try to fix our attention on consciousness and to see *what*, distinctly, it is, it seems to vanish: it seems as if we had before us a mere emptiness. When we try to introspect the sensation of blue, all we can see is the blue: the other element is as it were diaphanous.” (Moore (1903), p.25)

That is, it seems that when I focus my attention on the experienced blueness of the sea or sky, I attend to properties of the sea or sky, not to properties of my experiential state. However, Moore continues the above passage:

“Yet it [the sensation, or ‘other element’] *can* be distinguished, if we look attentively enough, and if we know that there is something to look for.” (Ibid.)

That is, we can also take up a stance with respect to our visual experience such that the experience is, at least partly, *opaque* – we can attend to properties of our experience that do not seem to be properties of the experienced environment. Most recent discussion of

these considerations aims at establishing their bearing upon the debate between representationalists and non-representationalists about perceptual experience. Representationalists (e.g. Harman (1990), Dretske (1995), Tye (1991, 1995, 2000)) argue that the transparency of experience supports the thesis that experience consists only in the representation of facts about the perceiver's environment and her relation to it. Non-representationalists (e.g. Block (1996), Shoemaker (2002), Loar (2003)) argue that experience can be opaque with respect to objects and properties of the perceiver's environment, and that this supports the thesis that experience involves awareness of sensory properties that outrun its representational properties. I won't be directly concerned with this debate in what follows.<sup>1</sup> Instead, I want to consider the significance of Moore's observations about experience for *enactivism*. Enactivism about perceptual experience (defended in various forms by Varela, Thompson and Rosch (1991), Hurley (1998), Noë (2004, 2008, 2009), Thompson (2007), and Hutto & Myin (2013)) involves the claim that perceptual experience essentially depends upon capacities for intentional agency. Here, I am interested in a version of enactivism according to which there is essential *interdependence* between perceptual experience and agency – one that also holds that capacities for agency essentially depend on capacities for perceptual experience.<sup>2</sup> This paper aims to motivate and explicate such a view through exploring the phenomenon of transparency that Moore's remarks identify.

What should an enactivist predict, and what must they explain, in light of Moore's observations? They must, like anyone interested in the transparency of experience, explain how it is possible to take up each of two apparently conflicting attitudes to one's experience – viewing it as transparent or as opaque – and how these attitudes are related.

The enactivist should also predict that analogues of Moore's observations, and the explanations they receive, will apply to agency. For if perception and agency are essentially interdependent, then our account of the essential structure or nature of one capacity must invoke facts about the other. The simplest instance of such interdependence would be *symmetrical*, such that for every property of perception that is explained partly through appeal to agency, we find a parallel property of agency that receives parallel explanation through appeal to perception.<sup>3</sup> How would this look in the case of transparency? Well, suppose we take Moore's observations to suggest something like this: There is an essential duality to perceptual experience – we can attend either to the worldly situations that experience reveals, or to the sensory appearances through which they are revealed to us, but apparently not to both at once (I do more to motivate this construal in the next section).<sup>4</sup> In that case, we should expect to find some parallel duality in the case of agential experience. Moreover, our account of the relationship between the dual aspects of perception should be paralleled in the case of agency. And, since the enactivism on which we will focus is a thesis about the *essential* and *symmetrical* interdependence between perception and agency, we should expect a constitutive explanation of the duality in each capacity to invoke facts about the other capacity, and expect the constitutive explanations of each duality to exhibit parallel structures.

These, I take it, are substantial requirements. If we found that such parallels obtained, first between a structural duality in perception and in agency, and second between plausible explanations of those dualities, each of which made essential reference to the other capacity, then the truth of enactivism could be invoked as a simple and compelling explanation of why such parallels exist. I will show that we find such parallels when we

consider the phenomenon of transparency, and draw out the consequences of these parallels for enactivism. The next section makes a *prima facie* case that there are relevant parallels to be explored by briefly clarifying the perceptual phenomenon under consideration, and describing a parallel phenomenon for agency. Section three sketches an account of the interdependence of these phenomena by considering the interplay between perception and agency in the possession and exercise of perceptual and practical skills. Section four further clarifies and motivates this account by applying it to Ivo Kohler's (1964) landmark studies on perceptual adaptation. There we will see that the account can accommodate important nuances in Kohler's results that trouble its competitors. Section five concludes by describing the enactivism I think we should infer from the structural and explanatory parallels identified in the previous sections and clarifying its philosophical significance.

## **2. Transparency in Perception and Action**

Look at the labelled squares in the checkerboard illusion.<sup>5</sup> One looks white (and in shade), the other looks grey (and well lit). Now attend to them independently of their role in the picture, as two coloured patches. You should be able to see that they are, in fact, identically coloured. With a little effort, you can shift between seeing them as differently coloured squares on a depicted chessboard and as identically coloured patches on your monitor. However, doing so does not seem to involve shifts in the character of your experience. Rather, what alters seems to be your attitude towards, or mode of attention to, the constant character of your experience. Moreover, it seems impossible to take up both attitudes at once – we can see the squares as identically or differently coloured, but

not as both simultaneously. Attending to the squares in one way precludes attending to them in the other. Two more examples: when I look at the circular lip of a cup from an angle, I see it as circular. Yet there is also a sense in which it appears elliptical – I can see that it looks like an ellipse would if viewed from above, or that I would draw its apparent shape from here by drawing an ellipse. I cannot, it seems, attend to the circular appearance and the elliptical aspect of the cup's lip simultaneously. Similarly, I can attend either to the shapes, colours and sizes of the dots that make up a pointillist painting, or to the scene depicted by those dots, but not to both at once.

In what follows, I argue that these examples illustrate three general points about perceptual experience: In perceptual experience, our attention is usually directed upon the worldly objects and situations with which experience puts us in touch; however, we can also attend to the ways in which we are put in touch with objects and situations – that is, we can attend to the sensory appearances through which the world is revealed to us; yet it seems impossible to attend to our experience in both these ways at once – each mode of attention precludes the other.

Here is an example of the parallel phenomenon for intentional agency. When typing fluently, your experience is of typing words and phrases, not of typing letters, or of the details of the movements of your fingers as they strike the keys. But try shifting your attention to the details of the positions and movements of your fingers while typing, or the letters you are typing. You will not be able to do so without disrupting the fluency of your typing, even though it seems you are merely shifting your attention to an aspect of your activity that was there all along. Two more examples: when I unreflectively reach out to turn a door-handle in front of me, I do so through moving my body in specific

ways appropriate to that task. Usually, insofar as I experience what I'm doing in such a case at all, I simply experience myself as grasping a handle, or opening a door. However, I can also attend to the details of the bodily movements I am making. Again, doing so seems to involve shifting attention to an aspect of my activity that was there all along. It seems, though, that I cannot simultaneously experience my activity as a detailed sequence of movements and as a world-directed action at the same time. Similarly, when a ballet dancer performs through making a complex and coordinated sequence of bodily movements, he cannot simultaneously attend to the details of those movements on pain of disrupting his performance, despite the fact that his performance is achieved through those movements, and that those movements are there to be attended to throughout.

The duality we find in perception between that which we experience and the sensory appearances through which it is experienced has a parallel in agency; the duality between the action we experience ourselves as executing and the bodily movements we use to execute it. So here are the three parallel points that, I will argue, the above examples illustrate: when we act, our attention is usually directed upon the objects and outcomes we intend to effect; however, we can also attend to the movements we are using to execute our intentions; yet it seems impossible to attend to our activity in both these ways at once. Consequently the success of our activity is often compromised if we attempt to attend to the movements through which that activity is pursued. This appears to parallel the way in which attention to sensory appearances can stop them playing their usual role of disclosing objective properties, as when attention to the dots in a pointillist painting prevents us from simultaneously experiencing the depicted scene.



Two caveats about the scope of the above points. First, perhaps not all perceptual and agential experiences exhibit the above dualities. If I experience a homogeneous field of uniform colour, perhaps there is no distinction between what is involved in attending to the object of my experience and attending to the sensory appearances through which I experience it. Likewise, if engaged in a simple action such as flexing a leg muscle, perhaps there is no distinction between what is involved in attending to my action and in attending to the movements with which I make it. As we'll see in section 5, the enactivist view outlined here will have something to say about both types of case. For now, the above remarks are supposed to show only that there is a *prima facie* case that many of our perceptual and agential experiences seem to exhibit the above dualities. If this is granted, then it's plausible that investigating such dualities might reveal something interesting and important about perception and agency.

Second, whilst the above characterisations of experience are hopefully uncontroversial, the question of what (if anything) they reveal is not. Some answers to that question will be incompatible with the enactivism I think is supported by the above parallels and their explanations. For example, one might react to the duality identified for perception by holding that one level of experience is privileged or primitive – that *strictly speaking* we experience only sensory appearances, and experience objective features and properties only in some derivative or misleading sense (or vice versa for objective features and sensory appearances). On such views, characterising perceptual experience as involving a duality is misleading, so the project of uncovering parallel dualities in perception and agency that each receive complementary explanations is a non-starter. Alternatively, perhaps the above examples point not to an interesting conclusion about enactivism, but to a boring one about attention – that we are no good at attending to two

things at once. Neither possibility has been undermined at this point. Thus far, I have only made a *prima facie* case for the existence of one kind of parallel which enactivism predicts between perception and action. To show that this parallel is real and significant in the way the enactivist requires, I need first to show that it can be plausibly accounted for in the way they suggest.

### **3. Enactivism and Sensorimotor Skills**

Enactivists hold that perceptual experience and agency are essentially and symmetrically interdependent, and so must give a constitutive explanation of the duality in each capacity that makes essential reference to the other capacity.<sup>6</sup> Here, in outline, is the explanation which the next two sections will motivate: A perceiver's capacity to experience sensory appearances as transparent to the worldly situations they disclose essentially depends on those appearances directly and non-inferentially poising her to act in ways distinctively appropriate to those situations. An agent's ability to experience the fine details of her bodily movements as transparent to the higher-level actions she executes through them essentially depends on her perceptual sensitivity to the presence of the opportunities those actions aim to exploit. Transparency in perception and in action thus essentially depends upon the subject's possession of abilities; to act in the case of perception, and to perceive in the case of action. The relevant abilities are constitutively and symmetrically interdependent – that is, we cannot make sense of the subject's possessing such perceptual abilities without invoking facts about what she is able to do, or of her possessing such practical abilities without invoking facts about what she can perceive.

What does all that mean, and why believe it? Considering what is involved in the possession and exercise of perceptually guided skills helps with both questions.

Bruce Lee's character ('Lee') in *Enter the Dragon* claims that, in combat, 'When I see an opportunity, *I* do not hit; *it hits* all by itself.' Let us take him at his word. The quote suggests that he perceptually experiences not just opponents and their movements, but also opportunities; that his experiences of such opportunities are bound up with the execution of the actions they afford; and that he does not consciously infer or decide upon the movements and timing of his action, but experiences his action as spontaneously drawn from him by the situation.<sup>7</sup> What capacities must we credit to Lee to make it intelligible that he experiences things in this way? First, an immediate, non-inferential perceptual sensitivity to the relevant kind of opportunity – otherwise his experience will be of deducing that the opportunity is there from what he sees, not of being immediately moved to action by his experience of it. Second, the ability to quickly and fluently act in a way tailored to the requirements of the situation – otherwise his experience will be of seeing the opportunity and striving, or being unable, to do something about it.

Those perceptual and practical capacities are constitutively interdependent – intelligibly crediting him with one requires him to possess the other. Lee couldn't experience the situation in the way suggested by his quote if he could perceive the opportunity, but lacked the capacity to act upon it. For then, it seems, he would experience the situation as belonging to some theoretical type, not as immediately compelling him to act. His perceptual sensitivity to the afforded opportunity must engage with a practical grasp, rather than a detached theoretical understanding, of what can be done if it is to issue in the experience the quote describes. Conversely, his possession of

the relevant practical ability depends on his capacity to deploy it in light of his perception that it is currently appropriate. If he accidentally struck his opponent via the ‘right’ movements (by flailing around, having a muscle spasm, or trying to do something else) this would not constitute a deployment of his skill. His skill consists not just in the ability to make some sequence of movements, but in making movements appropriately attuned to the perceived contingencies of his situation, that would remain so attuned throughout a variety of subtly different situations. So what Lee can skilfully do is dependent on how he can perceive the situation, and how he can perceive the situation is dependent on what he can skilfully do. This is an instance of the structural interdependence of perception and agency to which enactivism is committed.

How does this bear on transparency? Due to his range of bodily skills, Lee’s perceptual experience can be transparent in a way that yours or mine is not – it can directly present him with opportunities for, and impediments to, various combative techniques, rather than merely with positions and situations from which such opportunities and impediments may be inferred. His experience of his skilled activity can involve a parallel transparency – he can directly experience himself as performing certain techniques in response to the situation’s perceptible demands, rather than as performing deliberations preceding, or movements making up, those techniques. These instances of transparency are constitutively interdependent. That is, Lee’s possession of the capacity to directly perceive his situation in terms of its demands is intelligible only if he also possesses the capacity to act in response to those demands. And his possession of the capacity to experience his action in terms of the opportunity it exploits is intelligible only if he possesses the capacity to perceive the situation in terms of such opportunities. So there are parallel dualities in Lee’s exercise of both his perceptual and his agentic

capacities, with each duality essentially depending on facts about the corresponding capacity.

Here is another case. Our experience of our activity when typing fluently involves transparency – though our typing involves moving our fingers and striking keys, we experience ourselves as directly executing intentions to type whole words (perhaps whole phrases). When typing fluently, our experience of finger movements and keystrokes is transparent in that the experience of our activity is directed through them to the typings of words that they realise. Fluent typing involves a parallel instance of perceptual transparency, pertaining to our proprioceptive sense of the position and movements of our fingers over the keys. Just as Lee directly experiences environments in terms of the opportunities for attack or defence they afford, so we (when typing fluently) experience the position and movements of our fingers in terms of their actual and potential contributions to the typing of words. Our perceptual experience of the fine details of the position and movements of our fingers is transparent in that it is directed through them toward the actually and potentially salient affordances for typing words that those positions and movements allow.

Remember your days as a novice typist. Neither your agential nor your perceptual experience were transparent in the above ways. Though your goal may have been to type the same words, you had to achieve this by consciously and intentionally seeking out and pressing their constituent keys. And your proprioceptive sense of the position of your fingers on the keyboard told you nothing about how to move in order to type the desired words – instead you had to look and see how the actual and potential positions of your fingers were related to your goal of typing a word or phrase.<sup>8</sup> Progression from novice to

fluent typist altered the ways your perceptual and agential experiences could be transparent. This amounted to altering both what you could do with (or through) the keyboard, and how you could perceive it. When typing fluently you can now use the keyboard in the direct and non-inferential execution of an intention to type a word. And you can now perceive the position and movements of your fingers over the keys in terms of their actual and potential contributions to your current projects of typing words.

Again, these new practical and perceptual abilities are essentially interdependent. We can experience our activity as the typing of a word, rather than the pressings of some keys, only if we experience those keystrokes and the movements required to make them as automatically drawn from us in light of our perception of the situation. Otherwise we would experience those keystrokes and movements as individually decided upon and executed by us on the basis of the perceived position of our hands. But this is how the novice, not the expert, experiences their typing. So the fluent typist's way of experiencing their activity essentially depends on a capacity to perceive their fingers upon the keys in a particular way. In turn, this perceptual capacity essentially depends on the practical ability to quickly and fluently type words and phrases. Without that ability, the typist might have a perfectly acute sense of the position of her hands upon the keys, but could not put this sense to use in fluent typing. Rather than automatically grasping what to do on the basis of that sense, she would have to make inferences about how her goal of typing was best achieved in light of the sense's deliverances. And this is how the novice, not the expert, perceives the position of their fingers upon the keys.

This explains why attending to the letters one is typing, or to the movements one is making, disrupts fluent typing. Fluent typing involves having one's perceptions and

intentions directed at words – sensing the position of one’s fingers in terms of their actual and potential contribution to typed words, and perceiving the movements of one’s fingers in terms of the words they bring about. This point about the direction of the typist’s perceptions and intentions is just a different expression of our characterisation, above, of the particular way in which the skilled typist’s intentions and perceptions are transparent to their objects: she experiences herself intending and effecting words and phrases through the transparent movements that bring them about; she experiences the position of her fingers in terms of affordances for typing intended words through the transparent details of their position which determine those affordances. One’s perceptions and intentions being directed and transparent in these ways is partly constitutive of fluent typing.<sup>9</sup> Attending to keys, finger movements, or individual letters, thus involves directing one’s perceptions or intentions in a way that is necessarily incompatible with fluent typing. And since exercises of the perceptual and practical capacities involved are constitutively interdependent, directing attention in a way that frustrates the exercise of one will necessarily cause the other to break down. The enactivist thus gives a unified explanation of why the skilled typist cannot simultaneously attend to each aspect of the duality of either her perceptual or her agential experience when typing. And the explanation generalises to other cases. We should suppose that, like our typing, Lee’s skilful performance would break down were he to attend either to his bodily movements, or to the objective features of his perceptible environment through which opportunities to act were revealed to him.<sup>10</sup> On the above account, this is because it is necessarily impossible for him to attend to his action simultaneously as a strike appropriate to his current situation and as a detailed sequence of bodily movements, and necessarily impossible to attend to his situation simultaneously in terms of its objective perceptible

properties and in terms of the opportunities it affords. Each impossibility receives a parallel explanation: the transparency of his bodily movements to his skilful actions, and the transparency of the objective properties of his perceptual situation to the opportunities currently afforded, are each constitutive features of the activity in which he is engaged. And since the instances of perceptual and agential transparency essential to his activity are constitutively interdependent, directing his attention in a way that frustrates one instance of transparency necessarily causes the other to break down.

We have now seen various instances of parallel phenomena of transparency for perception and agency, and how the parallel phenomena considered in this section can be given an explanation in terms of the symmetrical constitutive interdependence that characterises enactivism. However, the two activities we have just used to illustrate and work through the form of such explanation are both instances of sensorimotor skills demanding a tight interplay between the subject's perception and action. Perhaps it is unsurprising that we should find strong bonds between experience and agency here, even if the nature of those bonds is just as the enactivist suggests. So our next task is to examine a source of evidence that might allow the enactivist to generalise beyond the cases of sensorimotor skills considered above.

#### **4. Enactivism and Perceptual Adaptation**

One important source of support for the claim that visual perception essentially involves sensorimotor skill<sup>11</sup> has come from reflection on what Kohler's (1964) studies of perceptual adaptation show about the relationship between perception and action.<sup>12</sup>



Kohler's subjects went about their daily business while wearing goggles that invert the visual field, thus disrupting their capacities for veridical perception of, and fluent engagement with, their environment.<sup>13</sup> Adaptation involves both perceptual and practical components – subjects must come to understand the new way in which their visual experience informs them of their relation to their environment, and must adjust their intentions and activity to fit with the way their environment is really arranged, rather than with the way their distorted sensory experience presents it as being. After a period of disruption to their perceptual and intentional activity, subjects adapt to the goggles, regaining their ability to navigate and act upon their environment without inference or deliberation about how to move in order to achieve their goals. Moreover, subjects report that the way things look and feel to them reverts to normal over the course of adaptation – the distortive interface imposed by the goggles has become transparent for them. When the goggles are removed, subjects undergo a period of complementary distortions, disorientation and adaptation.

These results are supposed to support enactivism by showing that the acquisition of familiarity with the new goggle-induced sensorimotor contingencies – that is, the new ways that sensory experience varies with movement and discloses possibilities for action – coincides with the adaptation of perceptual and agential experience. Moreover, the fact that removing the goggles causes a new period of perceptual distortion and adaptation suggests that familiarity with such sensorimotor contingencies is a determinant of the content and character of our everyday perceptual experience – the normalisation of the experience of adaptees depends upon their regaining a familiarity that standard perceivers already possess.<sup>14</sup>

Kohler's studies are a useful test case for us since they appear to involve disruption and adaptation of both perceptual and agential experience. However, existing accounts of Kohler's results treat one instance of adaptation as primary, and attempt to explain the other in its terms. One camp (whose members include Taylor (1980), Hurley (1998) and Noë (2004)) holds that subjects' perceptual experience adapts whilst the content of their intentions remains fixed. The fluency and experienced immediacy of action returns, they claim, only because perceptual experience reverts to being just as it was pre-goggles, and so regains its fit with unchanged practical capacities. A second camp (whose members include Harris (1980), Linden et al (1999) and Prinz (2006)) holds that experience remains distorted, but that the spatial content of subjects' intentions adapts. On that view, adaptation consists just in the return of a subject's capacity to act in and upon their environment in a way that is directly and non-inferentially informed by their perceptual experience. Contra the first camp, that capacity is not restored in virtue of perceptual adaptation, but through the contents of subjects' intentions adapting so as to fit with the distorted way their perceptual experience now presents the world.

Each position is problematic. As Klein (2007) notes, the fact that Kohler's subjects regain abilities to engage in fluent perceptually-guided intentional behaviour, such as skiing, bicycling and fencing, whilst reporting that their visual experience remains inverted tells against the first explanatory strategy. However, the fact that adapted subjects sincerely report that things visually look to them as they did before, not just that they have learned to cope with the new way that things appear, tells against the second.

The enactivist has independent reasons to reject both problematic positions. If perceptual and agential capacities are symmetrically and constitutively interdependent then we

should not expect either to adapt while the other remains fixed. More specifically, the enactivist holds that the capacity to experience sensory appearances as transparent to the worldly situations they disclose essentially depends on those appearances directly and non-inferentially poising a subject to act in ways distinctively appropriate to those situations (as when Lee's ability to see an opportunity to strike depends on his being poised to strike by his perceptual sensitivity to relevant features of his situation). Conversely, the capacity to experience the details of one's activity as transparent to the goal at which it aims essentially depends on the capacity to perceive one's situation in terms of its affordances of such goals (as when Lee experiences himself as striking, rather than as moving his body, in virtue of his capacity to perceive his situation in terms of opportunities to strike). So, if enactivism is true, then neither of the above views on adaptation is viable. The first view holds that the direction of subjects' intentions remains unchanged throughout their reacquisition of the capacity to directly perceive the spatial affordances of their environment, but the enactivist holds that the direction of intentions depends on the regained capacity. The second view holds that subjects' perceptual experience remains unchanged throughout the reacquisition of the capacity to act in direct and non-inferential response to perception of their surroundings, but the enactivist holds that the content and character of perceptual experience depends on the regained capacity.

Given this, the enactivist should expect Kohler's experiments to show the following: perceptual and agential adaptation consist in regaining the transparency involved in perceiving and acting before the goggles were donned. That is, perceptual capacities adapt such that subjects can see through the abnormal appearances caused by the goggles to the distal spatial properties of their environment; practical capacities adapt

such that subjects can experience their activity as a direct response to the perceived situation, rather than a sequence of movements whose fit with the situation is inferred on the basis of perception. Since the regained capacities are constitutively interdependent, perceptual and agential adaptation will occur together. And, given what we have learned about transparency thus far, it should be possible even after adaptation for subjects to direct their attention to the unusual ways things appear through the goggles, or the unusual relationship between how things are perceived and the movements they make to act upon things – neither perceptual nor agential adaptation will be unequivocal.

In fact, due attention to the reports of Kohler's subjects reveals compelling evidence for such a view. As noted above, the hypothesis that perceptual experience adapts to fall back into line with subjects' unchanged intentions is troubled by cases where the return of fluent intentional behaviour appears to precede experiential adaptation, as when Kohler reports of an adapting subject:

“On the fourth day the subject went on a bicycle trip. On the last [6<sup>th</sup>] day he went on a skiing excursion. During all this time, however, his perceptions were only sporadically right side up...” (Kohler (1964) p. 31)

However, the apparent support for the view that intentional or behavioural adaptation precedes (or obviates the need for) perceptual adaptation is undercut by Kohler's subsequent clarification of the sporadic circumstances where orientation was veridically perceived: “...things appeared right side up only when they were simultaneously touched [...] or when they happened to be in the subject's immediate vicinity” (Ibid), suggesting

that the return of normal vision first occurs when perceiving something that is being acted upon, or which could be acted upon (as when it appears in the subject's peripersonal space). We find corroborative observations throughout the accounts of adaptation. For example, Kohler reports of the subject described above: "During a simulated fencing match the subject parried all blows correctly, even though the *opponent* was seen upside down" (Ibid, my emphasis). However, Kohler's subsequent discussion of the fencing tasks (p.154) suggests that, when immersed in the task, the trajectory and orientation of the approaching *rapier point* was perceived correctly – that is, the part of the world with which the subject was engaged in successful fast and fluent visually-guided interaction was perceived veridically while the rest was not.<sup>15</sup> One further example of the interdependence of fluent intentional activity and the return of veridical perception: describing his own experience of walking down a hill after thirteen days wearing the goggles and before visual adaptation had occurred, Kohler writes:

"At first the impressions are very contradictory. I *feel* myself closest to the ground where it appears furthest away. But this impression does not last for long. More and more frequently it alternates with a particularly satisfying feeling that 'everything fits,' especially, it seems, the more dangerous and steep the incline. At such moments of course I have no time to be critical about my images; the tactile impression transmitted by hand and foot wins out every time, and suddenly everything 'fits together.' But when I have reached the foot of the incline, a region of much less danger, then I notice that the optical picture is 'really' reversed, and I wonder why I had not noticed this during the descent itself." (p. 156, original emphasis)

Here (as in the fencing case), the subject is in a situation that demands responses of a speed and fluency incompatible with consciously inferring the movements he should make on the basis of his distorted experience. He is forced to allow his perceptual sensitivity to his environment to draw the appropriate movements from him, and when he does so the content of his spatial experience seems to normalise.<sup>16</sup> Fluent perceptually-guided action and veridical perception return together.

Kohler's quote brings out the second important feature of his results for the enactivist: the distinct and apparently contradictory attitudes subjects can take up toward their visual experience. Above, Kohler implies a contrast between how things are experienced during his steep descent and how his experience seems upon subsequent reflection. Similarly, Kohler reports of the fencer described above that "the subject saw the rapier point approach in reversed direction as before when instructed to have a 'critical set towards visual experience'" (p.154), and reports the following exchange between an adapting subject ('Grill') and his colleague (Professor Erissman):

"Grill says: 'It seems that everything in vision is the way it really is; the house, for instance, which I see through the right window, really appears to be on the right; and the parts of the car look just as they would feel if I were to touch them...' Prof. Erismann comments: 'Did you experience this *visually*?' But this critical question is too much. The subject withdraws: 'Please... I can't say I *saw* this correctly, for vision in this case was *uncontrolled vision* ... I sat in the car and didn't think about anything in particular, and suddenly I thought that people

walked by on the correct side, and not through me... funny things are happening, particularly when I don't think about them..." (p. 154-5, original emphasis and ellipsis)

Such observations all suggest a contrast between the distal properties and situations which adapting or adapted subjects can veridically experience (when engaged in, or seeing possibilities for engaging in, visually-guided interaction with them) and the abnormal sensory appearances through which they are experienced.<sup>17</sup> The fact that, in many circumstances, adapted subjects say that things spatially appear just as they did before the goggles were donned suggests that the abnormal appearances can become transparent for the subjects, and we saw evidence above that their becoming transparent coincides with the return of the subject's capacity to engage in fluent visually-guided interaction with the environment. But, in keeping with our account of transparency, the aberrant appearances are still there to be attended to. What is such a shift in attention like, phenomenologically, for Kohler's subjects? Of the shift between experience of distal spatial properties and of distorted sensory appearances which occurs during adaptation, 'Grill' notes that "this isn't a sudden reversal; *the picture remains the same but it is experienced differently*" (p.155, my emphasis). So here is another clear parallel with our other cases of transparency. Just as we can shift from seeing the scene depicted by a pointillist painting to seeing the dots through which the scene is depicted without sudden change in the character of our experience, Grill can shift from veridically seeing distal objects and properties to experiencing the distorted appearances supplied by the goggles. And just as inappropriate direction of attention can frustrate the instances of

transparency we considered above, so Grill's attention to sensory appearances prevents him from seeing through them to the distal properties they reveal.<sup>18</sup>

Do we find a parallel duality in adapted subjects' experiences of their fluent activity, as the enactivist should predict? Here is one suggestive observation. Kohler and Erissman are attempting to test Grill's assertion, eighteen days into adaptation, that he veridically experiences the layout of the street when he stands next to the wall.

"We ... gave Grill the instruction to stand near the wall. This being done, he walked to the curb and stumbled off the sidewalk. To our astonished query he replied, 'I saw the wall there (points left) and thought, well now you go right, since that's the way to be sure to get there. This proves to me that I saw the wall correctly in the first place and that I don't have to make any more corrections!'" (Ibid, p.155)

If Grill is typical of Kohler's subjects, some of whom can cycle, ski, and fence after eighteen days, then his visuomotor behaviour should be largely normal by this stage – he should be able to negotiate his visible environment fluently, without needing to infer or deliberate over the movements he should make (his being able to do so would explain Kohler and Erissman's astonishment at his falling off the curb). That is (according to the enactivist), he should be able to experience his activity as a direct response to his perceived situation, rather than as a sequence of movements calculated to fit his situation. But this is not what happens in the episode described above. Grill and the experimenters are explicitly concerned with the fit between Grill's visual experience and the spatial



properties of his environment. Perhaps because of this, Grill tries to navigate to the wall not by being unreflectively guided by his experience, but by thinking about the movements he should make on the basis of how things are presented to him in experience. The enactivist suggestion is that Kohler's subjects can take up two perspectives with respect to their activity – experiencing it as a direct response to the perceived environment, or as a sequence of movements whose fit with the perceived environment is inferred – and that Grill's shifting to the second perspective is responsible for the disruption of his fluent visuomotor behaviour, in just the same way that shifting one's attention to one's finger movements disrupts fluent typing.

However, we should not set too much stock in a single example. The other aspects of the enactivist interpretation of Kohler's results are supported by multiple parts of Kohler's data. Unfortunately, because Kohler was interested in visual adaptation, there is little in his reports to inform an account of the agentic experience of his subjects. Whether or not the agentic experience of adapted subjects exhibits the duality predicted by the enactivist is an open empirical question which future studies might address.<sup>19</sup>

Let's take stock. We have been investigating the possibility that consideration of the phenomenon of transparency reveals a symmetrical interdependence between perception and agency of the kind to which enactivism is committed. The previous section characterised that interdependence with the help of two examples of visuomotor behaviour, and showed how such interdependence can underpin instances of perceptual and agential transparency. In this section we have been investigating whether Kohler's work on perceptual adaptation gives us reason to apply this view of the interdependence between perception and agency beyond clear cases of visuomotor skill. We saw that

enactivism makes the following predictions about Kohler's cases, which differ substantially from existing explanations and accounts of his results:

1. Perceptual and agential adaptation will both occur, and do so simultaneously.
2. Perceptual adaptation will be equivocal – adaptees will still be able to attend to the distorted sensations through which they perceive their environment.
3. Attending to sensations in this way will disrupt the restored veridicality of subjects' perceptions.
4. Agential adaptation will be equivocal – adaptees will still be able to attend to the inverted movements that must be used to effect their perceptible environment.
5. Attending to movements in this way will disrupt the restored fluency of subjects' actions.

Close attention to the reports of Kohler's subjects reveals compelling evidence for the first three points, and Kohler also reports at least one case that appears to support the last two. So the enactivist view of the interdependence between perception and action affords an account of Kohler's results that avoids the problems faced by existing interpretations, and can predict and explain nuances in Kohler's data that are ignored by existing interpretations and that appear quite mysterious from their perspectives. If Kohler's results show something general about the relationship between perception and action, then what they show is the truth of enactivism. Adaptation to Kohler's goggles consists in regaining two interrelated kinds of transparency: of perceptual sensations to worldly situations, and of bodily movements to the opportunities and outcomes they aim to exploit. The reports of Kohler's subjects give us good reason to think that these two

forms of transparency are essentially interdependent in just the way the enactivist suggests.

### **5. Enactivism, Transparency and Intentionality**

The observations about transparency with which we began have been invoked in support of many claims about perceptual experience. I have argued that they can also be invoked in support of a form of enactivism – the previous sections aimed to show that we find parallel and essentially interdependent phenomena in both perception and agency with just the nature and structure we would expect if enactivism were true. Enactivism is offered here as the best explanation of these parallels. But there is a deeper motivation for arguing for enactivism in this rather baroque way. The interrelations between the transparency we find in perception and in agency are, for the enactivist, symptomatic of the interdependence between the ways in which one's perception and one's agency are directed upon the world. Understanding this latter interdependence helps us better understand the explanatory ambitions of enactivism.

I noted above that precedent for an enactivism that stresses the interdependence of perceptual and agential capacities is found in Hurley (1998). There Hurley notes that corresponding to the Myth of the Given – the idea that contentful perceptual experience can consist in passively received input from the world to the mind – is the less infamous Myth of the *Giving* – ‘the idea that the contents of intentions directly reflect the spontaneously active mind, are a matter of pure output’ (p.76). Suppose we agree that the Myth of the Given is to be avoided; that our capacity to be informed about the world

through perception is one that requires explanation. One plausible strategy for avoiding this myth is to appeal to our capacities as agents. Perception can inform us because we can spontaneously and actively impose conceptual forms on perceptual sensations (Kant 1998, Sellars 1956, McDowell 1996), or because it puts us in a position to discriminate, classify, or otherwise act upon the world (Pettit 2003, Matthen 2005), or because we understand our capacities to skilfully manipulate our ongoing sensory relationship to the world (Noë 2004, 2012). Insofar as such strategies neglect to explain how active exercises of conceptual, classificatory or sensorimotor capacities have the particular contents that they do, they court Hurley's Myth of the Giving; if we agree that our perceptual capacity to be *given* material for thought and experience by the world stands in need of explanation then it is unclear why this should not also be true of our practical capacity to *give* determinate content to our activities and practices.<sup>20</sup> So if, like many, we are tempted to avoid the Myth of the Given by appealing to facts about our agency, we should do this in a way that acknowledges that our capacities as agents are themselves in need of explanation.

The account of perception and agency as constitutively interdependent capacities implied by the above treatment of transparency suggests how we might avoid both myths together. The previous sections concerned cases where the ways perception could be directed upon the world depended on the ways in which activity could be directed, and vice-versa. The perceptual and practical capacities of Kohler's subjects returned together – veridical perceptual experience of spatial layout is imposed upon what would have been a chaotic jumble of sensation when the subject acquires the ability to non-inferentially tailor their actions to the layout of their environment on the basis of that sensation. But

the ability to act in non-inferential response to the spatial affordances of the situation (rather than to make movements based on an inferred fit with the situation) is in turn dependent on perceptual sensitivity to those affordances – what would have been a mere sequence of movements becomes an action aimed at grasping some opportunity when the subject acquires the capacity to allow their movements to be unreflectively guided by her perceptual sensitivity to the presence of that opportunity. We might thus sum up the enactivist view as follows: In perception, the world draws actions from us; in agency, we draw experiences from the world; the capacities to relate to the world in each of these ways are constitutively interdependent. If we accept this view, then the projects of understanding perception and agency are interrelated aspects of an overarching project – understanding what is involved in our minds being directed upon the world. Upon this construal, the phenomenon of transparency with which we have been concerned is of fundamental importance for understanding our mindedness.

Returning to some points left unresolved at the end of section 2 lets us see why. There we briefly mentioned possible reasons to doubt that the phenomenon of transparency yields general morals about perception and action. Perhaps the phenomenon results from a quirk in our capacities to attend – for example, a simple inability to simultaneously attend to objects and to visual sensations. Perhaps there are cases of perceiving and acting – viewing a homogeneous expanse of colour, flexing a leg muscle – that do not exhibit transparency. We are now in a position to understand how the enactivist should respond.<sup>21</sup> We saw in section 3 that the enactivist gives a unified explanation of the impossibility of simultaneously attending to each aspect of the duality in one's perceptual and agential experience. To attend to an opportunity to strike, rather than to shapes and

positions, was to bring a specific set of skills to bear on one's situation – the skills of a martial artist rather than those of, say, a painter or photographer. Likewise, in Kohler's studies we saw that adapted subjects could attend to either their distorted visual sensations or the properties of the environment that those sensations disclose to them. Attending to the latter was bound up with the capacity to skilfully act on one's perceptible environment; attending to the former was bound up with adopting a detached or critical attitude to one's visual experience. It is impossible for Lee or Kohler's subjects to simultaneously attend to both aspects of these experiences insofar as it is impossible for them exercise both of the corollary sets of skills simultaneously. A parallel point applies for agency – Lee cannot simultaneously attend to his strike as a response to the situation and as a detailed sequence of movements; we cannot simultaneously attend to our activity as fluent typing and as detailed finger movements. As we noted in section 3, this is because fluent striking or typing constitutively depends on the capacity to perceive one's situation in terms of its striking or typing affordances, rather than affordances for mere bodily movements. Attending to each aspect of agential experience is impossible insofar as it is impossible to exercise each perceptual capacity simultaneously. So, according to the enactive account offered here, the impossibility of simultaneously attending to each aspect of the duality in perceptual or agential experience is explained by a fact about what it is to have one's attention directed toward one (intentional) object rather than another. Where our attention is directed is a matter of the skills we bring to bear on our situation, and some sets of skills cannot be exercised simultaneously.<sup>22</sup>

The enactivist thus agrees that the phenomenon of transparency reveals something about our capacity to attend to objects, but denies that what it reveals is trivial. Transparency,

claims the enactivist, reveals the phenomenological structure required for being able to attend – to direct one’s mind in perception and agency – at all. This ambitious claim is, I think, what is most philosophically important and interesting about enactivism. Motivating it further will involve dealing with the other unresolved points from section 2: aren’t there cases of perceiving and acting that fail to exhibit transparency? Consider perception first. Are there cases where we perceive something, but not *by* or *through* perceiving something else?<sup>23</sup> Seeing a uniform expanse of colour seems a natural candidate. The enactivist holds that for experience to be directed upon an object the perceiver must grasp the bearing of her experience on her agential relationship to that object; or, what amounts to the same thing, she must understand how she can actively modulate her perceptual experience of that object.<sup>24</sup> Enactivists thus hold that surface colours are perceived *through* grasping one’s active relation to patterns of light and shade, shadows and gleams (Broackes 2007, 2011). But what about a field of colour that offered no such pattern, just pure homogeneity? Note first that even if you are in a *ganzfeld*, where every part of your perceptible environment yields identical perceptual sensation, you can still grasp the related facts that any exploratory movement you make will yield identical sensation, and that all accessible parts of the visual scene are equally silent as to the actions they afford.<sup>25</sup> Enactivists can hold that as long as grasp of this minimal relationship between perception and agency is maintained, experience will continue to be directed toward an object, even if that object is merely a homogeneous expanse of colour. But note also that this situation would, from the perceiver’s perspective, be indistinguishable from one where the relationships between activity and sensation had been severed rather than merely homogenized. The enactivist, it seems, should predict that a perceiver’s visual experience in such circumstances should be ambiguous between

experience of a homogeneous field and no experience at all. Interestingly, this bizarre prediction seems to be borne out by the reports of some ganzfeld inhabitants. Cohen (1957, p.407) quotes the following description as representative: "...everything blacks out, returns, goes. I feel blind. I'm not even seeing blackness. This differs from the black when the lights go out." Similarly, Billock and Tsou (2001, 2004) note that, when images are artificially stabilized on the retina (another way of creating a perceptual situation ambiguous between absent and homogenised sensorimotor contingencies),

‘Typically the perception ... would last a few seconds before the entire field would switch abruptly to blackness or nothingness. Then the [coloured] field would regenerate, either spontaneously or in response to a blink.’<sup>26</sup> (2001, p.2398-2399)

Moreover, they say, ‘Descriptions of this “black field” as “blacker than black” do not do it justice. Our subjects describe it as “like someone cut my optic nerves and I don’t have a visual system anymore” (2004, p.85). These reports suggest that despite their intact sensory sensitivity to perceptible features of their environment, subjects alternate between veridical experience of those features and a complete cessation of visual experience. The enactivist explains this result by noting that these are situations where it is indeterminate whether sensorimotor contingencies linking perception and action still obtain. The upshot, then, is that perception of a homogenous field of colour is not a counterexample to the enactivist claim that perceptual experience involves a transparency that is dependent on a grasp of how the perceiver can actively modulate the way the situation appears. Perceiving a uniform field of colour involves grasping the uniformity of



the different appearances that you can bring into view. The enactivist suggests that the cessation of visual experience that can occur in a ganzfeld, or due to the stabilization of images on the retina, occurs when such a grasp is lost.<sup>27</sup>

What is this supposed to show? The ambitious claim mooted above was that transparency, understood in terms of the interplay between practical skills and sensory capacities described in the previous sections, is a phenomenological structure required for having one's mind directed toward the world. If this is true, then a lack of transparency – or, what amounts to the same thing for the enactivist, a lack of interdependence between activity and experience – should entail a lack of experience. The ganzfeld and retinal stabilization cases, and the enactivist understanding of them, are presented as a first step towards defending the plausibility of this claim. Another necessary step will be to address a parallel issue for agency. If the ambitious enactivist claim is right, then severing the ties that link activity and experience should result in the extinction of agentive experience as well as perceptual experience. So addressing the final question we left dangling becomes pressing – are there cases of intentionally directed *activity* that fail to exhibit the kind of transparency we have been investigating? The enactivist holds that intentional agency requires the agent to grasp the relationship between movements and the perceptible outcomes at which they aim. Our agential experience thus involves a duality – we can attend either to movements or outcomes. But to experience those movements as directed toward outcomes – that is, to experience them as *actions* – we must grasp their relation to perceptual experience. So for the enactivist, the question of whether we can have an agential experience that fails to exhibit the duality characteristic of transparency reduces

to the question of whether we can experience ourselves as acting intentionally without a grasp of the perceptible consequences at which our actions aim.

Suppose I try, successfully, to waggle my finger. Plausibly, this is a basic intention, one which I can execute without trying to do anything else. But even in trying to waggle my finger (rather than to flex it, or keep it perfectly still), my action aims at a particular set of sensory consequences – feeling and perhaps seeing my finger doing particular things. And I experience myself as executing my intention insofar as I experience those consequences being brought about. Are there cases where these normal relations between activity and sensory consequences are severed – the kind of cases we need to test the enactivist claim?

There is a rich experimental literature devoted to manipulating experiences and judgments of agency by manipulating sensory feedback.<sup>28</sup> For example, building on classic studies by Nielsen (1963) and Fournieret & Jeannerod (1998), Farrer et al (2003a) manipulated subjects' judgements of agency by manipulating the extent to which the movements of a virtual hand presented on a screen deviated from the subjects' real hand movements, which were hidden from view. They found that the likelihood of subjects attributing the perceived movements to another agent increased with the level of distortion they introduced between the subjects' hand movements and those displayed on screen. However, this result falls short of what the enactivist needs. Even in cases where subjects judged that the displayed movements were not their own, they nonetheless experienced themselves as acting – as moving their hand around in a way that failed to correspond to what they saw. This, the enactivist should claim, is because they still (correctly) take themselves to be modulating their sensory experience in law-governed ways – whilst the experimental design disrupts the way in which *visual* feedback varies

with motor output, *kinaesthetic* feedback depends on motor output just as before, and accounts for the experience of agency that subjects still have. The right test case for enactivism would be one that severed ties between movement and kinaesthetic sensation too. Interestingly, when Farrer et al (2003b) performed a similar experiment with a deafferented subject (lacking kinaesthetic sensation) they found that when the relationship between the subject's movements and visual feedback was highly distorted, 'she reported impressions of not controlling her movements, and not being aware of what she was doing' (p.616). The enactivist interpretation of this result is that the subject no longer experiences her bodily activity as an exercise of agency – despite her intention to perform the drawing task, and making movements suited to completing this task – since the experimental setup has undermined her grasp of the way her movements relate to sensory consequences.<sup>29</sup> Another relevant case is that of Oliver Sacks (1986), who temporarily developed a form of somatoparaphrenia with respect to part of his left leg – as a result of a bad injury he could neither feel nor move it, and came to feel 'alienated' from it:

'It seemed to bear no relation whatever to me. It was absolutely *not-me* – and yet, impossibly, it was attached to me – and even more impossibly, "continuous" with me' (p.48).

This looks like a case where Sacks may have (with good reason) lost his grasp on a part of his body as a potential source of sensory feedback. In spite of this, should he not still be able to *try* to flex his thigh, and have the agentic experience associated with such trying?

The enactivist claims not, and this appears to be borne out when Sacks recounts his attempts of trying to move his leg:

‘I couldn’t *try*, I couldn’t will, I couldn’t think, I couldn’t recall. I couldn’t think or recall how to make certain movements, and my ‘efforts’ to do so were delusory, derisory...’ (p.43)

Moreover, during his recovery Sacks describes his experiences of trying as returning concurrently with his perception of involuntary muscle twitches:

“Here was a movement ... which involved active contraction of the whole quad – a movement hitherto impossible and unthinkable. And yet, in a trice, I had thought it, and done it. ... I had the impulse, flash-like – and flash-like I acted. The idea, the impulse, the action, were all one – I could not say which came first, they all came together. ... The impulse, the idea, the remembrance, flashed back – and I moved my leg (if ‘moved’ is not too deliberate a word for the utterly *undeliberated*, spontaneous movement which ‘occurred’).” (p.95-6)

If we understand Sacks’ condition as involving the loss and recovery of a grasp of his leg as a potential conduit of sensory consequences, then the enactivist can predict and explain his unusual agential experience. The suggestion is that a ‘basic’ action like flexing a leg muscle is not a counterexample to the enactivist claim that agency involves a transparency that depends on a grasp of the relationship between the agent’s movements and the perceptible consequences they aim to bring about. If the flexing of a muscle is to

be experienced as something that I *do*, rather than something that happens to my muscles, it must involve an understanding of the sensory consequences that the flexing brings about. The enactivist suggests that it is the return of this understanding that explains Sacks' experience of muscle twitches in his leg as exercises of agency.

Let's take stock. I began by drawing some parallels between transparency in agency and experience, and aimed to show that those instances of transparency were constitutively interdependent. In the previous section, we saw that this understanding of the role of transparency in perception and agency can predict and explain features of Kohler's work on perceptual adaptation that have been mishandled or ignored by existing treatments. The enactive account of transparency was offered as the best explanation of the range of cases considered in sections 2 – 4. In this section my aim has been to clarify the understanding of perception and action to which the previous sections point. The real lesson of transparency, I suggest, is an enactive one. Pure sensory input, divorced from skilful activity, does not suffice for experience. To see something is always to understand how it is revealed to you *through* something else, and this understanding is available to us in virtue of our capacities as agents. Likewise, pure motor output, divorced from perceptual sensitivity, does not suffice for agency. To intentionally do something is always to understand one's bringing it about *through* something else, and this understanding is available to us in virtue of our capacities as perceivers. There is no pure 'Given' in perception or 'Giving' in action – perception and action work together as two aspects of a single capacity to have one's mind intentionally directed upon the world. The phenomenon of transparency with which we began this paper is thus something that is

achieved, in virtue of our capacities as agents, as much as it is given, by our capacities as perceivers.<sup>30</sup>

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<sup>1</sup> See Crane (2006), Kind (2003) and Martin (2002) for illuminating surveys of and comments upon that debate. Alston (1999, 2005), Martin (2002) and Kennedy (2009) argue for naïve realism on the basis of transparency. Ultimately I think that the view I defend in what follows supports a naïve realist view of the relation of experience to objects. See Speaks (2009) for an alternative proposal about the relevance of transparency to our thinking about perception.

<sup>2</sup> Such a view is explored in Hurley (1998). Though the other forms of enactivism listed above focus on the dependency of perception on agency, they are all compatible with the further claim that agential capacities reciprocally depend on perceptual capacities.

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Because I think (for reasons that will emerge in what follows) that viewing perception and agency as essentially *interdependent* is the most plausible form of enactivism, I will use ‘enactivism’ to refer to a view that endorses this interdependence claim.

<sup>3</sup> Of course, the interdependence between perception and agency might instead be asymmetrical. So failure to find parallel phenomena and explanations between perception and agency need not undermine enactivism. The interdependence may also be symmetrical with respect to some phenomena, but not to others. An aim of this paper is to make plausible that, at least with respect to the phenomenon of transparency, the dependence is symmetrical.

<sup>4</sup> As I use ‘transparent’ in what follows, experience is transparent when we are aware only of the objects of experience, not of the ways in which those objects are subjectively presented to us. But an experience’s being transparent in this sense does not preclude our *becoming* aware of properties of the experience other than how it presents its objects. This is a departure from the way some parties to the representationalist/non-representationalist debate understand transparency (e.g. Block (1996), Tye (2000)), who mean transparency to entail the *impossibility* of becoming aware of properties of one’s experience that are independent of the properties of the experienced objects.

<sup>5</sup> The checkerboard illusion depicts a cylinder, lit from behind, standing on a chessboard and casting a shadow on some of the squares. A white square depicted as in shadow is rendered in the same shade of grey as a black square depicted as in good light. Despite being rendered in identical colours, one square is perceived as black and the other as white.

<sup>6</sup> Bear in mind (as per n.2, above) that I’m not hereby attributing this claim to any of the authors standardly construed as enactivists. Again, though, for reasons that will follow I

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think this is the most plausible form of enactivism, and one that is consistent with the work of the main enactivist authors cited above.

<sup>7</sup> The above are all frequently cited aspects of the phenomenology of skilled athletes and performers immersed in peak activity across many cultures and domains. In David Foster Wallace's *Infinite Jest* a former tennis player describes a similar experience: 'The court becomes ... an extremely unique place to be. It will do everything for you. It will let nothing escape your body. ... You slip into the clear current of back and forth, making delicate X's and L's across the harsh rough bright green surface, your sweat the same temperature as your skin, playing with such ease and total mindless effortless effort... You're barely aware you're doing it. Your body's doing it for you and the court and Game's doing it for your body. You're barely involved' (p.166). Another nice example is from the autobiography of ice hockey goalie Ken Dryden: 'When a game gets close to me, or threatens to get close, my conscious mind goes blank. I feel nothing, I hear nothing, my eyes watch the puck, my body moves ... I don't tell it to move or how to move or where, I don't know it's moving, I don't feel it move – yet it moves. ... I see something in the way a shooter holds his stick, in the way his body angles and turns, in the way he's being checked, in what he's done before that tells me what he'll do – and my body moves. I let it move. I trust it and the unconscious mind that moves it' (p.214-215). See Csikszentmihalyi (1990) for extensive description and discussion of such experiences.

<sup>8</sup> Note that even here your perception and agency manifested transparency in the sense under discussion. You didn't see which key to press by first seeing the shape marked on it – as a skilled reader, your perceptual experience was directed toward the appropriate letter due to your perceptual sensitivity to the shape which realised it (cf. the experience

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of someone learning to read, or using a keyboard with characters in an unfamiliar language or font). Nor did you press the right key by intending to do something with your body – as a skilled user of your body, your perception of the right key coupled with your intention to strike it took care of the details of your movement for you (cf. the experience of someone learning to use a prosthetic device, or regaining the use of a limb after a long period of injury).

<sup>9</sup> Someone might learn to type equally fast by focussing intently upon individual keys and movements, but this is not what we do when we type fluently.

<sup>10</sup> The phenomenon of the ‘yips’ in sports is a familiar illustration of the detrimental effects upon performance of ‘overthinking’ one’s movements or the situation to which one is responding. See e.g. Bawden and Maynard (2001) for an interesting review.

<sup>11</sup> Other important lines of support include Hurley’s (1998) exploration of various arguments for the claim that the unity of perceptual consciousness constitutively depends on agency, Hurley and Noë’s (2003) compilation of empirical support for the claim that sameness and difference in the character of sensory experiences tracks sameness and difference in sensorimotor contingencies, and Noë’s (2004, 2005, 2008) offer of enactivism as the best explanation of how perception acquires volumetric content.

<sup>12</sup> Similar procedures and results to Kohler’s are reported in Stratton (1897), Taylor (1963, 1980), Yoshimura (1996) and Linden et al (1999). I focus on Kohler (1964) since he provides the most detailed descriptions of subjects’ experiences of adaptation. See below, and note 17, for my reasons for being unimpressed with Linden et al’s claims to have shown that perceptual adaptation does not occur.

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<sup>13</sup> Kohler also conducted experiments with left/right reversing goggles, distorting prisms, and various coloured goggles. The following discussion is restricted to up/down inverting goggles, though the morals I draw can be applied to all the cases of spatial distortion and adaptation.

<sup>14</sup> The claim that Kohler's results show something general about the role of sensorimotor contingencies in perceptual experience (rather than something about their role in experiments like Kohler's) is made more plausible by viewing Kohler's results alongside the other empirical evidence enactivists adduce in support of the role of sensorimotor contingencies in normal perception. See Hurley (1998), Hurley and Noë (2003) and Noë (2004) for reviews. Although Noë's use of Kohler's results to support his enactivism has been widely criticised (by Block (2005), Prinz (2006), Aizawa (2007) and Klein (2007)) those critics do not challenge the supposition that the results support general conclusions about the relationship between perception and agency. As will become clear below, close attention to Kohler's results shows how enactivists should respond to these criticisms.

<sup>15</sup> Space constraints prevent me from detailing and discussing several other relevant examples. But consider also Kohler's observation that a subject's hands – their most frequent points of intentional engagement with the environment – were the first objects to be perceived as veridically oriented (p.32), and his description of an identical dependency of experiential re-inversion on engagement with objects (either manually or by touching them with a stick) for a different subject (Ibid.). See also the experiment described on pp. 157-8, and the observations on pp. 161-3.

<sup>16</sup> Kohler goes on to note that: "Observations of this kind became more and more frequent, and were tested in all kinds of situations: for example, when subjects walking

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over a narrow board were pushed off sideways by the experimenter, everything was suddenly in order at the moment of the push; at other times, however, the subject would be in doubt whether the right foot was visually ‘right’.” (Ibid.)

<sup>17</sup> See also Kohler’s remarks on the different results obtained by measuring adaptation in laboratory and free vision settings on p. 45-6, p. 153-4 and p. 162 (Ibid). Those remarks, and the examples above, show why we should reject Linden et al’s (1999) claim to have demonstrated that visual experiential adaptation does not occur. In addition to using trials of a length that Kohler’s results suggest are insufficient for full adaptation, they base their claim on asking subjects about what they experience, and monitoring subjects’ performance on an extraction of gradient from shading task. But as Kohler acknowledges (and the enactivist account explains), asking subjects to reflect and report on their experience can disrupt the experience of adaptation, and laboratory tests of specific aspects or determinants of visual experience fail to capture the extent of adaptation in free vision.

<sup>18</sup> Note that asking subjects to report upon their *visual experience*, in contrast to reporting on how they experience the world around them, is apt to influence subjects to direct their attention in just this way. Professor Erismann, reflecting on his own experience of adaptation to prismatic goggles suggests after ten days that the perceptual distortions “have become less pronounced. I am hardly aware of them now. I think this is because they are not part of the environment on which my attention is focussed. Even when I do notice them, it is in a highly subjective manner.” (p.62)

<sup>19</sup> Here is another example that I think supports this aspect of the enactivist view: with a little practice it is possible to become relatively proficient at writing and drawing whilst looking only at a reflection of one’s hand in a mirror. The process of adapting to

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the new relationship between the visually perceived position of one's hand and the movements required to execute intentions to write or draw parallels the adaptation required of Kohler's subjects. The relevant parallel prediction is that the adaptation of one's visuomotor behaviour involves coming to experience one's writing or drawing activity in terms of the intentions it aims to execute, not the movements through which this is achieved, and that attempting to attend to such movements should disrupt the fluency of one's action. When I try this, it seems to me that this prediction is borne out. To succeed in fluently writing what I intend, I must let my activity be unreflectively guided by what I see in the mirror – that is (on the enactivist interpretation) I have to experience my activity as a direct and non-inferential response to the affordances for writing that I have learned to see in the mirror image. If I attempt to attend to the specific movements I make while writing then the fluency of my performance disappears. Of course, I am neither an unbiased nor a theoretically uncontaminated subject.

<sup>20</sup> One way in which Hurley (1998, ch.6) brings out the need for an explanation of how our activities and practices get their content is through considering Wittgenstein-inspired skeptical arguments about rule-following. Being confronted with the puzzle of what (if anything) determines that my activity is properly described as, say, *addition* rather than *quaddition* helps us see why the problem of how we can 'give' content to our worldly activities is as pressing as the problem of how the world can 'give' us material for thought and knowledge in perception.

<sup>21</sup> Note that compelling assent to these enactivist responses is beyond the scope of my task here – doing so would, I think, require a deeper exploration of arguments that purport to show that perception, agency and attention *must* have the structure under

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discussion. I think we find good arguments to this effect in the work of Hegel and Merleau-Ponty, among others, though discussion of them must wait for another occasion.

<sup>22</sup> Integrating these brief remarks on attention up with relevant empirical and philosophical literature is another important and interesting task that I can't attempt here. The view briefly outlined above comports well, though, with the view of attention as selection for action defended in Wu (2011, 2014) and Bulot (2011).

<sup>23</sup> More needs to be said about the status of the appearance properties on the enactivist account. My locutions here, and throughout, might be taken to imply a particular conception of the relation between sensory appearances and the properties they reveal; one whereby appearance properties are non-representational 'qualia' or the 'mental paint' via which objective properties are depicted. This conception, however, will not sit well with enactivists who endorse a naïve realist or relationalist view of perception (e.g. Noë 2008, 2009; Ward 2012) due to the indirect view of perceptual experience it implies. An alternative, following Noë (2004), is to construe appearance properties as objective properties of a perceiver's relationship to her environment – perhaps including lighting conditions and the perceiver's state of perceptual adaptation – and so construe a shift in attention from the perceived object to appearance properties as a shift in attention from i) the object to which one is perceptually related, to ii) aspects of the perceptual relation itself. The account developed in this paper is intended to favour the latter construal for at least two reasons. Firstly, we have seen various cases where the properties or features through which the object of perception is revealed to us do not fit the description of qualia or mental paint – e.g. when Bruce Lee sees an opportunity to strike through his sensory awareness of spatial properties, or when we see the words on the page through



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our sensory awareness of the letters which compose them. Secondly, the examples we are about to consider are intended to put pressure on the idea that there are ‘pure’ sensory appearances that are essentially independent of their agency-mediated role of disclosing objects to us. This latter construal, of course, faces the problem of explaining the qualitative or felt dimension of episodes of sensory awareness. Tackling this problem is beyond the scope of my task here – though see Ward, Clark and Roberts (2011) for one enactivist proposal.

<sup>24</sup> It is worth noting that not all enactivists follow O’Regan and Noë (2001) and Noë (2004) in holding that sensorimotor contingencies must be ‘grasped’ or ‘understood’ to issue in perceptual experience. Block (2005) and Hutto (2005) raise objections to enactivist views that appeal to sensorimotor understanding. According to the view I wish to endorse, the relationship between a subject’s perceptual and practical skills involved in perception is one which already implicates the relevant kind of understanding – the links between Bruce Lee’s perceptual and practical capacities constitute the kind of sensorimotor understanding required to perceive opportunities to strike. A full articulation and defence of this conception of sensorimotor understanding is a task for another paper. However, precedent for the view of the interdependence of understanding, perception and agency that is at issue here can be found in McDowell’s work on practical wisdom (e.g. McDowell 1979).

<sup>25</sup> Noë (2004, p.135) makes the first of these points.

<sup>26</sup> Ellipses added here to suppress the complication that Billock and Tsou (2001) were working not with a homogeneous field of colour, but with a dichromatic one. The goal of stabilizing these images on the retina was to induce experiences of ‘forbidden’ colours

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– reddish greens and bluish yellows – which they succeeded in doing in most subjects prior to visual blackouts.

<sup>27</sup> As Billock and Tsou (2004) note, the fading of retinal images is usually attributed to ‘transient temporal properties of some retinal mechanisms’ (p.84): cells on the retina get ‘fatigued’, and stop responding to stimulation. This would not explain, however, why the stabilized image spontaneously disappears and returns. Moreover, they argue that this explanation is inadequate since around 80% of retinal cells have ‘a sustained response to both achromatic form and color stimuli’, and that ‘most visual mechanisms (including achromatic form, color and depth)’ can function in the absence of input from the class of retinal cells that are susceptible to ‘fatigue’ (p.85).

<sup>28</sup> See David et al (2008), pp.524–527 for a review.

<sup>29</sup> Of course, further empirical work is needed to validate this interpretation. At present, there are only a couple of relevant studies with deafferented subjects (Farrer et al 2003b, Balslev et al 2007), both of which are concerned with the sense of ownership of a visually perceived action rather than with the presence or absence of a sense of agency tout court. Remember, though, that my current goal is only to explain and demonstrate the minimal plausibility of the form of enactivism at issue in this section.

<sup>30</sup> Thanks to Olle Blomberg, Andy Clark, Tomas Bogardus, David Harris, Alisa Mandrigin, audiences at the Universities of Warwick and Edinburgh, and an anonymous referee for helpful comments and suggestions.